



JULY 1988

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The Pikes Peak Radio Amateur Association meets on the second Wednesday of each month at Giuseppe's Depot Restaurant at 10 S. Sierra Madre at 7:30 p.m. All amateurs and interested parties are invited to attend.

Editor: Keith Goobie NYØT, 5335 Coneflower Ln., Colorado Springs, CO 80917 637-1525

PRIMER ON LIGHTNING (PART 3)

This article is extracted from THE OKLAHOMA WEATHER WATCH, Volume 2 Number 3, the newsletter of the Oklahoma NWS Severe Weather Net. The previous two parts were contained in the June edition of Ø-Beat

INTRACLOUD LIGHTNING

W. David Rust, N6KCH

Intracloud (IC) lightning is any lightning that does not connect with the ground. There are other names often used, e.g., cloud flash, intercloud (which really means between clouds), and cloud-to-air discharge. Within the category of IC lightning, there are other less technical names such as sheet lightning, which is a flat sheet-like appearance to the light coming out of a cloud; rocket lightning, which is so named because it seems to move through the sky like a rocket with a fiery exhaust; and heat lightning, which is a common name given to lightning on hot summer evenings in storms so far away that thunder is not heard (the name can also be used for cloud-to-ground lightning under the same circumstances).

IC flashes can be either mostly vertical or mostly horizontal. If horizontal, they can cover large distances, with several hundred miles having been observed by astronauts from the Space Shuttle. IC flashes move at speeds of about 10-100 km/s (22-225 mph). The current flow can be a few thousand amps, and while generally not as intense as a channel to ground, IC channels pose a hazard to airplanes and spacecraft

flying near and through clouds. The hazards are both by direct strike and by induced coupling of fast rise-time voltages into micro-circuitry such as computers. The first lightning in a storm is usually intracloud, and preliminary evidence suggests that the growth of the storm cell and the increase in the flash rate of intracloud lightning are closely correlated. Evidence is now mounting that the rate of occurrence of IC flashes may be tied to severe weather. For example, while a small thunderstorm generally has three times as many IC as ground flashes, the storm that produced golf-ball to tennis-ball sized hail in the Yukon, OK, area last year had 20-40 times as many IC as CG flashes. Other storms have been documented to produce even higher ratios of IC flashes for sustained periods.

A more quantitative link between IC flashes and severe weather has been documented in detailed case studies of a few tornadic storms. We have found that the IC flash rate increase follows the initial increase to peak intensity of the mesocyclone (parent circulation for tornadoes if they occur). Then, as the mesocyclone begins to dissipate, the rate of IC flashes also decreases and CG flashes begin to occur much more frequently. There are studies just beginning that will test whether the amount of rainfall is tied in an understandable way to the occurrence of lightning. If so, then lightning data could be used to augment radar data as inputs to computer-calculated amounts of rain reaching the ground. Finally, when you are out on storms, watch for strange phenomena associated with IC lightning, such as different colors, sustained glows for several seconds, very high rates in severe storms, and those phenomenal long rocket-lightning discharges that race along beneath the anvil for miles.

de KD5IA

"THE VIEW FROM THE PEAK"

by George Hinds, N8CIX/Ø

You're a member of ARRL: as an active amateur, you have a stake in the future of amateur radio. (If you aren't supporting the group speaking out in your behalf as an amateur, better re-think your priorities).

I mention the ARRL because of an important editorial in the July issue of "QST" under the heading "It Seems to Us ..." on page 9; the title is "Due Process, and RFI."

Every amateur should read this with concern - while Congress has given the FCC the green light to adopt RFI interference suppression requirements for home entertainment equipment, the Commission has instead chosen to place restrictions on you, the licensed amateur... and the proposed rewrite of Part 97 Rules for amateur operating will say "The FCC may restrict operations as necessary to prevent harmful interference." Read this editorial - you may decide to take up the issue with your congressman.

"ON THE SPOT" AT THE TELLER HILL CLIMB

Among the amateurs assisting in the safe operation of the recent Teller County Hill Climb auto race were three who happened to be at the right place at the right time; KEØOW Roxy Van Houton, NØHNZ Jan Hamilton and NØHRD, Will Zimmerman, all from the Mountain Amateur Radio Club.

Long after the day's racing activities were over Saturday evening, these three remained on the scene when they were told of a medical emergency nearby. It turned out to be critical; their call for help was answered on the Woodland Park 145.16 repeater and the sheriff and EMT's summoned.

The male subject was suffering from an illness that, had it not been for the availability of ham radio help, could have been fatal lacking prompt attention. As this is being prepared, he is still in a Colorado Springs hospital recuperating and again the willingness of hams to serve the public has likely saved a life.

A USER OPINION ON THE KENWOOD TM-721A:

"DON'T FLY WITH YOUR HEAD DOWN IN THE COCKPIT" applies to not driving down the road trying to determine what the frequency, offset, etc., reads on that rig down under the dashboard. Following adoption of back-lit Liquid Crystal Displays (LCD), the bugaboo of "impossible to see in bright light" LED displays on the mobile rig was over; those who could promptly banished LED rigs from mobile service. Mobile operation at once became simpler and safer.

Not so, however, with the new Kenwood 2M-440 TM-721A dual bander. (And, from magazine ads, the new TM-621A dual band 2M-220 rig). Having purchased a TM-721A sight unseen based on advertisements that promised an "LCD" display, I started on a road trip that lasted over a month -- a month of increasing dissatisfaction with my new transceiver for just one reason: a display that is difficult, sometimes impossible to see in bright sunlight! To safely select frequencies in sunlight often required that I pull over to the roadside and stop.

Enough! On arriving home I removed the TM-721A from the car. It's now in my fixed station at home... Current production models of most Kenwood mobile rigs have highly visible back-lit LCD displays; why not the "deluxe" line? TM-721A owners I've talked to have this same complaint. A suggestion: before you decide to purchase, find someone who owns this model and check it out in sunlight. You be the judge...

"IT GOES ALL THE WAY UP TO WHITE LIGHT!"

It's the Realistic PRO-2004 scanner. Snapping up one at an almost "distress" price before driving off on vacation, I was particularly pleased with the performance. Though a little large compared to other scanners, it's superior in selectivity under "big city" RF conditions. Frequency coverage is from 25-520MHz and 760-1300MHz (but the factory disabled cellular coverage can be restored) so you can monitor all ham bands from 10M FM to 1.2GHz. You can program in up to 300 channels; or search in 10 different memory banks! NFM, WFM and AM reception is programmable. And its LCD display is outstanding in visibility ...

73, George N8CIX/Ø

ANTENNAS

by Chris Smith

NXØE

Many interesting antennas are high impedance devices. For example, a single wire rhombic antenna is typically an 800 ohm antenna, and multi-wire rhombics are usually 600 ohms. Broadband dipoles may be 600 ohm antennas, and log periodic dipole arrays can range from 200 to 800 ohms. This month's column will describe an 800 ohm balun which illustrates some of the difficulties in designing broadband transformers at high impedances.

Transmission line transformers are the key to broadband transformers. Conventional transformers suffer from the effects of winding capacitance and magnetic non-linearities. They can be made to work at RF but satisfactory performance is usually achieved only over a narrow band of frequencies and at lower power levels. In a true transmission line transformer, the winding capacitance is distributed in the transmission line, affecting only the Z_0 of the line. Also, the power transfer occurs through the transmission line mode (equal and opposite currents in the two conductors comprising the transmission line) which does not contribute to the net magnetization. The common mode currents which magnetize the core are those which the transformer should suppress. Therefore, magnetic cores may be employed at much higher power levels than with conventional transformers.

The step-up of impedance from 50 to 800 ohms is a 16:1 ratio. This may be conveniently done in two steps of 4:1 each. Many designs for 4:1 transformers exist; Figure 1 shows two of them. Both are transmission line transformers, but Figure 1(a) requires one core and Figure 1(b) requires two. The final design, shown in Figure 2, cascades both designs. One less core would have been required if the design of Figure 1(a) had been cascaded with itself. However, the resulting performance would have suffered. The ideal Z_0 of the transmission line winding is $\sqrt{Z_{in} * Z_{out}}$, or in the case of a 4:1 transformer, $2 * Z_{in}$. The first transformer steps 50 ohms up to 200 ohms so the winding should be 100 ohms. This is difficult to achieve but acceptable results occur when wire pairs are used. The second transformer steps 200 ohms up to 800 ohms so the line Z_0 should be 400 ohms. This is impossible to wind on a core. If the circuit of Figure 1(b) is employed, each of the two cores trans-

form half of the (balanced) 200 ohm impedance presented by the first transformer. Thus, each core transforms 100 ohms to 400 ohms with the ideal line being 200 ohms. This too is impossible to wind on a core, but you can come a lot closer to it than to 400 ohm line!

The output is not as simple as you might think. 800 ohm line is a very high impedance to deal with. For example, two no 18 wires must be spaced about 16 inches apart to yield 800 ohm line. Consequently, the output wiring and the feed throughs through the metal box (if employed) represent a significant shunt capacitance on an 800 ohm system. At the higher frequencies this will completely ruin the insertion VSWR of the balun. The circuit must be compensated if broad bandwidth is needed.

An old rule of thumb for broad bandwidth compensation is to employ the opposite sign of reactance in the opposite mode. Hence, if a circuit is perturbed by a shunt capacitance, use a series inductance to compensate. (This can be seen from the common representation of transmission lines as series L's and shunt C's. By pairing the undesired shunt C's with compensating series L's, the resulting circuit begins to represent a transmission line of $Z_0 = \sqrt{L/C}$. Assuming the design load impedance is Z_0 , a flat line results.) The compensation inductance of 0.4 uH can be seen in Figure 2. By the way, this represents a perturbing capacitance of only 0.6 pF, so you can see that it doesn't take much to do you in! The cores can be any good quality Q1 or Q2 ferrite. Q1 will allow fewer turns and results in better impedance performance at high frequencies. Q2 will result in lower loss (which in high impedance circuits is mainly due to dielectric loss in the core material, according to Jerry Sevick in "Transmission Line Transformers"). A newer material, CMD-5005, seems to be ideally suited but is not readily available in retail quantities. Sevick recommends a 1 inch diameter core for powers up to 200 Watts and 1-1/2 inch diameter cores for powers up to 1500 Watts.

I constructed a 200 Watt model using CMD-5005 samples. The balance was excellent: voltage unbalance of a few percent at worst. The impedance was measured with the balun terminated in an 800 ohm balance load and the VSWR was better than 2:1 up to 60MHz. At the higher frequencies, the output impedance level dropped to near 600 ohms. This was serendipitous - so did the antenna! Nevertheless, the results were gratifying for such a simple design.

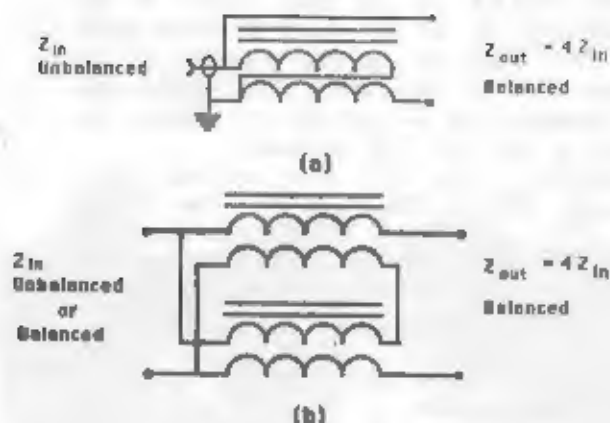


Figure 1

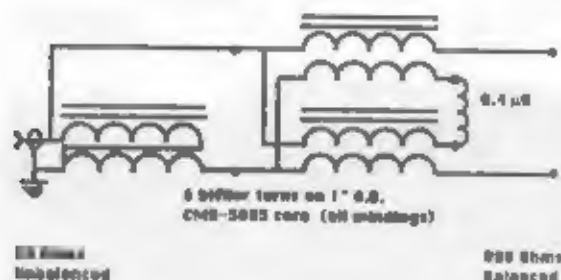


Figure 2

AMATEUR RADIO LICENSE EXAMINATIONS

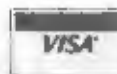
WHEN: Sat, 20 Aug 88 at 9:00 AM
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420 North Nevada Avenue
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TALK-IN: 146.37/97

NEED?

1. Original FCC license, if any
2. A copy of your FCC license, if any
3. Two forms of positive identification (driver's license, birth certificate, passport or library card)
4. \$4.55 check or M.O. payable to ARRL/VEC
5. Completed FCC form 610
6. If physically handicapped, a physicians certificate describing the nature of the disability. Arrangements should be made prior to testing

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FIELD DAY

88

Many groups were out in force putting their skills to work to show that they could assemble stations in adverse (?) conditions and then establish contacts with stations around the world. From this area, the following groups participated - Pikes Peak Radio Amateur Association, the Young Amateurs of Colorado (YAC), and the Mountain Amateur Radio Club.

The PPRAA set up their stations at the campgrounds of the Air Force Academy while the YAC group set up near Florissant at the cottage QTH of Oak KØROL. The weather did not cooperate fully but that did not undaunt the efforts of the Field Day enthusiasts.

Members of the YAC group included Becky KB6LSX, KB6IGN Nancy, WDØC Chas, WDØE Jim, NØISE Tim, NØIFT Mike, KAØWWB Evan, KAØNND Keith, NØJDU Alex, NØJEE Matt, NØION Dave, NØJAA Paul, KØROL Oak, AH6GF Irene, KP6PK Dick, along with their family members.

The PPRAA had quite a few attendees including the Channel 11 TV crew. Al has informed me that after his TV appearance, he is now ready to sign autographs.

Thanks to all that participated and see you next year.
Keith NØØT



Becky KB6LSX operates packet while Nancy KB6IGN watches. Good thing a fire extinguisher is not required



Jim WDØE studies up on the finer points of operating a Field Day station



Keith KAØNND and Bill NØIOG operate ten meters and the satellite station. They made 3 contacts through OSCAR-12



Mike NØIFT and Tim NØISE operate 20 meters. Antennas and trees sometimes mix.



Al NØCMW and Doc WØMCT survey the Field Day site. Trailer contains the VHF/UHF stations.



Chris NXØE demonstrates the proper way of installing the antenna in the highest location.



Al NØCMW is training Doc WØMCT on the use of the armstrong rotator.



Rick WB7THT is making contacts at the VHF/UHF station. How many people worked the rare ^{DV} on 6 meters.



Frank KAØYPX and Carolyn KBØBWI operate one of the Novice stations.



Mike KØTER shows how it is all done on 20 CW. He is checking a contact to see if it is a dupe.

WHERE IS IT AT?????

For some time now I have been writing about antennas. While there has been a lot of data put forth, it can, if you will, be tiresome, to read about the same thing all the time. This month I thought I would take some time, to answer some of those questions, that may or may not be in your head; with reference to where do I get that "THING"

First of all, something I came across in one of the magazines I read, is an item, that may be of some interest to those who have a tough time with the code. I'm sure you have all heard of "SUBLIMINAL" suggestion. A thought or group of ideas placed in your mind without you being consciously aware of the learning process, or acting upon some idea and you don't know why.

Here is an address where you can write to and get subliminal cassettes, that will teach you the morse code in one hour. Let me first say, I do not know how well it works but, if correctly done, I'm sure one can easily achieve success, in mastering the Morse Code. The Price for these little gems is, \$10.00. There is also a book with that, if you want it, making the price for both \$17.00. It comes with a money back guarantee. The address is:

BAHR
DEPT. 73-4
2549 TEMPLE
PALMBAY, FL. 32905

If your a little bit on the un-sure side, an SASE, to the address, will bring a Catalog, for free. Some other things that might be of use to you: Where do I get crystals made??? Try the following.

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FT. MYERS, FL. 33906

This is just a few of the places, of course there are more than these. There is not room enough to turn this into a jobber catalog. Next month I will list a few other items of interest, ie: circuit board mfg. coils, and filters, etc.

In a few months I will start a series of articles on basic antenna systems for the new ham. In other words a review basic things, like impedances for various types of antennas. 73's for now and hope this data helps. Paul KDSO

Phase 3C Operating Frequencies

These are the operating frequencies for the new Oscar-13 satellite which was launched aboard the the new Ariane 4 rocket. The satellite is still being positioned through a series of rocket burns and it is expected to be operational in the first week of August.

Mode B: Uplink: 435.420 - 435.570 MHz
Downlink: 145.975 - 145.825 MHz
GB: 145.812 MHz
EB: 145.985 MHz

Mode JL: L Uplink: 1269.620 - 1269.330 MHz
J Uplink: 144.425 - 144.475 MHz
RUDAK up: 1269.710 MHz
L Downlink: 435.715 - 436.005 MHz
J Downlink: 435.990 - 435.940 MHz
RUDAK down: 435.677 MHz
GB: 435.651 MHz

Mode S: Uplink: 435.601 - 435.637 MHz
Downlink: 2400.711 - 2400.747 MHz
Beacon: 2400.325 MHz

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UPCOMING SWAPFESTS

July 17 Denver Radio Club SWAPFEST
Jefferson County Fairgrounds, Golden

July 23/24 Mountain Amateur Radio Club
Swapfest & Campout, Woodlawn Park, CO

July 30 Ski Country ARC Swapfest
Glenwood Springs, CO - Details - K0GUZ

Sept 25 BARCFEST 88
Boulder County Fairgrounds - Details - N0BWS

NEW TRAFFLE

Starting as of last Saturday, Keith NY8T has started selling tickets for the 220 HT that will be given away at the Club Picnic in August. He will make every attempt to be at the Saturday morning breakfasts at the Village Inn on Saturday and he will be selling tickets at the Club meetings between now and then. If you want tickets and cannot make the breakfasts or the club meetings give Keith a call at home 637-1525. Price for the tickets are \$1.00 each.

REQUEST FOR INFO (NY8T)

I would like to include in the D-Beat a listing of the local nets on VHF/UHF and HF. Not being a net follower myself, I would appreciate if someone could compile a listing for me. It would see publication in the D-Beat on a Bi-Monthly basis or more often if desired by the readership. I would like to do the same for the VE tests as well.

To date I have the following:

Mon - Sun - Traffic Net - 2000 hrs
146.970 Mhz
Mon - Young Amateurs of Colorado
147.255 Mhz - 2000 hrs
Tue - Motorcycle Net - 2000 hrs
147.255 Mhz
Wed - AMSAT Net - 2000 hrs
147.255 Mhz
Thu - ARES Net - 2000 hrs
147.255 Mhz

ARTICLES FOR D-BEAT

Are you a budding author wanting to submit an article for the newsletter. There is another way you can get your files to the editor. That is through the telephone BBS called Dits & Bits. It may be reached @ 637-1375 and it supports up to 2400 bps. Of course, I will accept hand written articles as well as you can send me the files/article over packet as well.

TELLER COUNTY HILL CLIMB

Again this year Doc W8MCT organized the effort on behalf of the amateur community and again he is to be commended for a job well done. Helping him this year was KE9S Malcolm, W9MHL Mike, VE1ARC Phil, WB7THT Rick, NY8T Keith, KA9WIE Fred, K0TER Mike, WA8TAB Jim and KE9WC Don. Our communications provided a much more reliable net than the systems used by some of the race officials and we quite often reported accidents long before the other systems.

CLUB PICNIC

The Club Picnic is fast approaching. This year it will be held at the Air Force Academy courtesy of the AFA Radio Club. Jim WA9ABB is heading up the effort this year and would like to have you inputs and help. Please let him know if you would like to help in any way. Don't forget that the 220 HT will be given away at the picnic as well. Also let Jim know if you would like to see a mini-swapfest held at the same time.

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MINUTES OF JUN GENERAL MEETING

submitted by AJ MOCANW, secretary

The general meeting of the Pikes Peak Radio Amateur Association was held at Giuseppe's Old Depot Restaurant, Wednesday evening 08 Jun 1988. The meeting was called to order by the president Ron NKOP at 19:30, and an introduction was made by all members and guests present.

The minutes of the previous General Meeting and Board meeting were approved as printed in O-Beal

Committee Reports

Note: Anyone wishing to help out on any of these committees, please contact the chairman at the phone number listed. Thank you for your support.

Treasurer - Bud NODDE (599-7699)

Previous balance was \$1500.85, income of \$1712.50, expenses of \$646.32, leaving a balance \$2567.03.

Interference - Ron NKOP (593-8352)

Nothing to report.

Education - Harley KCOT (634-4555)

The Novice class was completed on Friday May 13, 1988.

Publicity - Karen NIFED (495-0091)

NIL

Colorado Council of Amateur Radio

Clubs (CCARC) - Oak KAROL (591-1426)

Bud spoke up for Oak and mentioned that the PPRAA will be hosting the CCARC in September.

Deaf and Blind School - Jim WA9ABB (598-7543)

Chris NXOE showed the new antenna to be installed in the attic of the D&B school.

O-Beal - Keith NYOT (637-1525)

Keith has set up a Phone Bulletin Board System so that people wanting to submit articles to the O-Beal may still be able to do so. The number is 637-1375. Thanks for the articles so far.

ARES - Mallory NOKF (591-0049)

Please return all brochures mailed out by Mallory

Public Service - Mike KOTER (636-1290)

Mike thanked all those who helped for the FOX run held in the Black Forest and the Walk America campaign. Will need help for the Rocket Launch on Aug 6&7 in the Wilkerson Pass area. It will be conducted in the same manner as last year.

VE Testing - Max KDEL (488-9289)

Max stated that the next VE Testing will be 20 Aug 88 at the 1st United Methodist church at St Vrain and Nevada.

SWAPFEST - Les KCNC (634-3995)

Les would like to thank all those who supported the swapfest and in helping to make it a huge success.

Teller Hill - Doc WAMCT (596-4216)

This year it will be held on Sat and Sun, the 11th and 12th of June respectively. On Sept 24th and 25th, the Divide / Cripple Creek race will need volunteers as well.

Field Day - Max KDEL (590-9849)

Dates are the 25th and 26th June at Air Force Academy Picnic Ground #3. Can not set up til Saturday morning, but we will be permitted to operate all Saturday Night.

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TAB BOOKS

Old Business:
Nil

New Business:

Mike KOTER mentioned that the Rocket Club was giving us first opportunity to set up a concession stand at the Launch Site. After some discussion, it was decided that the club would not pursue it.

Keith NYST disclosed that there was going to be a going away party for Phil VE1ARC this coming Friday evening.

Prizes - Keith NYST:

Winners were:

WD8CUJ	- World Radio Subscription
KE9S Malcom	- ARRL Operating Manual
N8ION Dave	- Mystery Box
N8CYR Jake	- Speaker
KE8PA Roger	- Extra Class Licence Manual
WD8BSZ Don	- QSL Cards
KA8VYZ John	- Advanced Licence Manual
KD8EL Max	- Repeater Directory

Program:

Max KD8EL who is orchestrating the PPRAA Field Day this year gave a talk on the preparations needed for Field Day and then gave details on how to get to the site.

The meeting was adjourned at 2130.

The next meeting will be 08 June 88.

MINUTES OF JUNE BOARD MEETING

submitted by AI N0CMW

The June Board Meeting was scheduled to be at the QTH of Keith NYST. Due to illness, it did not take place as planned and it has been scheduled for 5 Jul 88 at the QTH of NYST.

JULY MEETING

The next regularly scheduled meeting of the Pikes Peak Radio Amateur Association will be held on Wednesday, 13 July 88, at 7:30 PM at Giuseppe's Depot at #10 Sierra Street. The guest speaker this month will talk about Microwave Technology and Weapons being developed.

COMMITTEES

The following represents the list of those who volunteered to fill in on the various club committees.

ACTIVITY COMMITTEE

Renay Borst	KA8ROY
Jeffrey Boyes	KA8ZDY
Ronald Morris	KA8ZHO
George Lewis	N8HX1

PUBLICITY COMMITTEE

Karen Honer	N1FED
E. J. Lund	KD8NB
Don Ross	NL7CO
Don Hohisel	KE8GJ

MEMBERSHIP COMMITTEE

Jody Borst	KA8ROZ
Doug Brower	N8HJT

AUDIT COMMITTEE

Les Borst	KC8NC
Chris Smith	NX8E

TECHNICAL INSTRUCTION

Harley Hansen	KC8TQ
Nick Hulbert	K65N
Bud Libengood	N8DDF
Max Stafford	KD8EL
Bob Haggart	N8CTV
Ray Uberecken	AA8L

REL COMMITTEE

Ron Deutsch	NK8P
Bdale Garbes	N3EUA
Jeff Boyes	KA8ZDY
Ray Uberecken	AA8L

PROGRAMS & ENTERTAINMENT

Malcolm Benten	KE9S
Karen Honer	N1FED

MILEY'S RADIO

Jess KØTAA 719 W. 7th St. Florence, Colorado 81226 (303) 784-3040
Hours 9 to 6 Tuesday through Friday — Saturdays 9 to 1 — Evening Hours 7:30 to 10 (Call Ahead)
Closed Saturday 1 PM, Sunday & Monday
New Area Code Effective 3/1/88 (719) 784-3040
Will be closed, except by telephone appointment,
from June 9 through July 25, 1988.

Will get your phone messages by remote and call you
that evening or next morning. Please leave both
day and evening phone numbers on our machine.

If you're looking for a certain rig — put a message
on our machine and we'll try to find it for you.

In stock all the new equipment plus lots of
used equipment — please call.

Hamfest Schedule for 1988 as of February 1:

July 2—July 4 Rapid City, SD
July 9—July 10 Laramie, WY
July 16—July 17 East Glacier, MT
July 22—July 24 Woodland Park, CO
August 13—August 14 W.I.M.U. at Macks Inn, ID
August 13—August 14 Amarillo, TX
We will be at Amarillo.

73's — Jess

5/88

Membership Application PIKES PEAK RADIO AMATEUR ASSOCIATION, INC.

P.O. Box 16521
Colorado Springs, CO 80935

Name _____

Address _____

City _____ State _____ Zip _____

Call _____ License Class _____

Are You An ARRL Member? ☐ Yes ☐ No Telephone _____

☐ Full Member \$12.00 ☐ Family Membership \$15.00 ☐ Newsletter Only \$4.00
☐ Age 65 or older, or under 18 \$8.00

Additional Names _____ Call _____ Class _____

Associate Member \$8.00 ☐ (Outside Teller & El Paso Counties.)